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- T-471 P.002

F-967

Docket No. 5085

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the patent application of Ulli

Serial No. 09/926694

Filing date: 28.02.2002

Title: Method and Device for Partially Applying a  
Surface Coating and Breathable Film With  
Such a Partial Surface Coating

Group Unit: 1771

Examiner: Zirker

Declaration of Andreas Ulli  
Dorfstrasse 22  
9305 Berg  
Switzerland

Sir,

I hereby declare that:

I am the inventor of US application 09/926694. I am a mechanical engineer graduated from the Swiss Federal Institute for Technology. I am responsible for technical support of research and development and of customers for Cavitec AG, a sister company of the Assignee of the present application.

I was asked to review US patent US 4732800 and US 5827579 as well as the above mentioned application and to describe typical applications of the technologies disclosed therein.

## 1. Disclosure of US 4732800 or US 5827579.

These documents (see e.g. title of US 4732800) relate to a product to be adapted to be stuck hot by pressure to flat articles. Such products are also called interlinings or fusible interlinings (see title of US 5827579).

Such interlinings are intermediate products comprising a support element which is provided with adhesive material. The intermediate article is intended to form a composite product. For this purpose a composite element is welded to the support by the use of heat and pressure (see e.g. column 1, line 20-22 of US 4732800). Typically, these intermediate products are stored in rolls and the fusible interlining is subsequently bonded on cloths so as to obtain the complex wanted (see column 1, line 28-30 of US 5827579).

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The composite article is formed by welding a covering layer on one side of the flexible support.

The general principle of such interlinings is shown in the figure a of Annex I.

In order to weld the garment/cloth to the flexible support, the adhesive is heated up in such a way that it starts melting. US 4732888 and US 5827579 address the problem of so called "crossing" or "penetration" which is also called "return" (see column 1, line 26-28). When the adhesive is melted, it may penetrate the flexible support (which may be made of woven or knitted or non-woven material) and may thus soil the composite element. US 4732800 and US 5827579 address the problem of penetration/crossing/return. The solution according to these patents is schematically shown in figure b of Annex I. It is suggested to provide a second layer of a thermoplastic material arranged opposite the adhesive/garment. This layer is less fusible and thus operative as a barrier in relation to the first layer, i.e. it prevents return and crossing of the first layer/adhesive (see e.g. column 3, line 30-35 of US 4732800).

US 4732800 and US 5827579 show an interlining used to fabricate a two-ply composite structure. The interlining has, however, also a layer of thermoplastic material on that surface which is not to be covered with a garment/cloth.

Such composites are typically used for clothing which has, however, no specific functionality (which e.g. is not waterproof in view of the use of woven/knitted/non-woven material).

2. Solution according to the invention as disclosed in 09/926694 (point in point or PIP technology)

The invention disclosed in US application 09/851251 is directed to functional material, namely to waterproof, air permeable films which are used in functional wear. Such films are typically sold under brand names such as Goretex or Sympatex. The invention disclosed in the present application is directed to a three-ply laminate structure. Such a structure is schematically shown in figure c of Annex I. On both surfaces of a waterproof, air permeable film (forming a flexible support), there are arranged cover layers, e.g. made of a woven fabric.

The adhesive is only formed as a partial layer. The adhesive is typically formed as dots. Adhesive dots on both surfaces of the support material are aligned/arranged opposite one another. A discontinuous pattern of adhesive is necessary for the application of the support for functional

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wear. A permanent layer or also a partial, but non-aligned layer would reduce the air breathable properties of the support layer.

### 3. Comparison

In Annex II there is shown a comparison between a standard three-ply lamination (i.e. a waterproof, air permeable film which on both sides is provided with a cover layer but where the adhesive dots are not aligned) and a so called PIP (point in point) lamination according to the invention where the adhesive dots are aligned/arranged opposite one another on both sides of the film.

Such garments typically are used for military purposes. The table in Annex II typically shows requirements 2MVTR Soll" required by the Netherlands or NATO. The air permeability should be above 5800 g/m<sup>2</sup> 24h. This cannot be achieved with a standard lamination. With a PIP technology, an improvement in air permeability of around 40% may be achieved. Samples of these garments provided by a licensee of the present application are attached hereto as Annex IIIa - IIIg.

The structure of these garments is typically as follows:

#### a) MOD Camouflage

A support material of the type Aquator 20 supplied by Dupont/Investa was used.

The support material is covered by Polyamide and PA66 Fabric material on the upper and lower surface, respectively.

Dots of a moisture curing Polyurethane adhesive are applied on both surfaces of the support material for attachment of the cover layer.

In the case of the standard product, adhesive dots on the upper and on the lower side are not aligned. The air permeability is of about 3350 g/m<sup>2</sup> 24h. In the PIP-product made in accordance with the present invention adhesive points are aligned. The air permeability is of 5970 g/m<sup>2</sup> 24h.

#### b) Sample „Netherlands Camouflage“

A support material of the type by Aquator 20 supplied by Dupont/Investa was used.

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The support material is covered by a CO/PES (cotton/polyester) fabric and a polyamide fabric on the upper and lower surface, respectively.

Adhesive dots are applied on both surfaces of the support material for attachment of the cover layers.

The air permeability is of about 4850 g/m<sup>2</sup> 24h. In the PIP-product made in accordance with the present invention adhesive points are aligned. The air permeability is of 8400 g/m<sup>2</sup> 24h.

c) Sample „Nato Camouflage“

A support material of the type Auator 20 supplied by Dupont/Investa was used.

The support material is covered by Polyamide and PA66 fabric material on the upper and lower surface, respectively.

Dots are applied on both surfaces of the support material for attachment of the cover layer.

In the case of the standard product, adhesive dots on the upper and on the lower side are not aligned. The air permeability is of about 2950 g/m<sup>2</sup> 24h. In the PIP-product made in accordance with the present invention adhesive points are aligned. The air permeability is of 5000 g/m<sup>2</sup> 24h.

d) Sample „Nato Uni Oliv“

A support material of the type Auator 20 supplied by Dupont/Investa was used.

The support material is covered by Polyamide and PA66 fabric material on the upper and lower surface, respectively.

Dots are applied on both surfaces of the support material for attachment of the cover layer.

In the case of the standard product, adhesive dots on the upper and on the lower side are not aligned. The air permeability is of about 3450 g/m<sup>2</sup> 24h. In the PIP-product made in accordance with the present invention adhesive points are aligned. The air permeability is of 5500 g/m<sup>2</sup> 24h.

The samples according to PIP technology of these four different products are described by claim 8 of this application.

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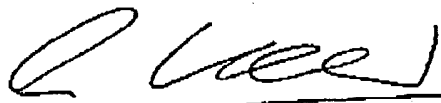
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These tests have been made in accordance with the standardized measurement method according to DIN ISO 15496 (see annex IV).

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that the making of wilful false statements or the like is punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patents issued thereon.

Andreas Ulli

  
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## Annexes:

Annex I

schematic comparison between prior art and the present invention

Annex II

result of comparative tests

Annex IIIa to IIIg

samples according to the tests

~~Annex IVa and IVb~~~~schematic representation of the present invention~~

Annex IV

DIN ISO 15496